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## International Journal of Multidisciplinary Research in Science, Engineering and Technology (IJMRSET)

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# The Challenges of Artificial Intelligence Implementation in Business: A Software Development Perspective

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**ABSTRACT:** This study examines the challenges of Artificial Intelligence implementation among small and medium-sized enterprises in Cantilan, Surigao del Sur from a software development perspective. Using Agile Software Development Life Cycle and Artificial Neural Network regression analysis, the developed AI Business Analytics System assessed implementation barriers including technical skill gaps, infrastructure limitations, system integration issues, and data quality constraints. Evaluation using ISO/IEC 25010 revealed strong functional suitability, usability, and maintainability, while reliability, compatibility, and security require further optimization. Results indicate that rural enterprises face significant barriers to AI adoption due to limited technical readiness and fragmented software development practices.

**KEYWORDS:** Artificial Intelligence; Software Development; Artificial Neural Network; Agile methodology; ISO/IEC 25010

### I. INTRODUCTION

Artificial Intelligence continues to transform modern business operations through automation, predictive analytics, and intelligent decision-making. Despite these advantages, many rural enterprises in Cantilan, Surigao del Sur experience challenges integrating AI technologies due to inadequate infrastructure, weak technical expertise, and poor software readiness. This study addresses these implementation barriers through the development of an AI Business Analytics System.

### II. LITERATURE SURVEY

Recent advancements in Artificial Intelligence (AI) and business analytics highlight the shift toward automated and data-driven business operations. Globally, AI-powered systems and machine learning technologies are used to improve prediction, decision-making, and business process automation. Locally, studies emphasize that while AI technologies continue to expand in the Philippines, many rural businesses still face challenges such as limited infrastructure, insufficient technical expertise, and unstable internet connectivity. Existing research suggests that localized, web-based AI systems with predictive analytics and user-friendly interfaces can help small and medium-sized enterprises improve data management, business analysis, and digital transformation in rural communities.

### III. DESIGN AND METHODOLOGY

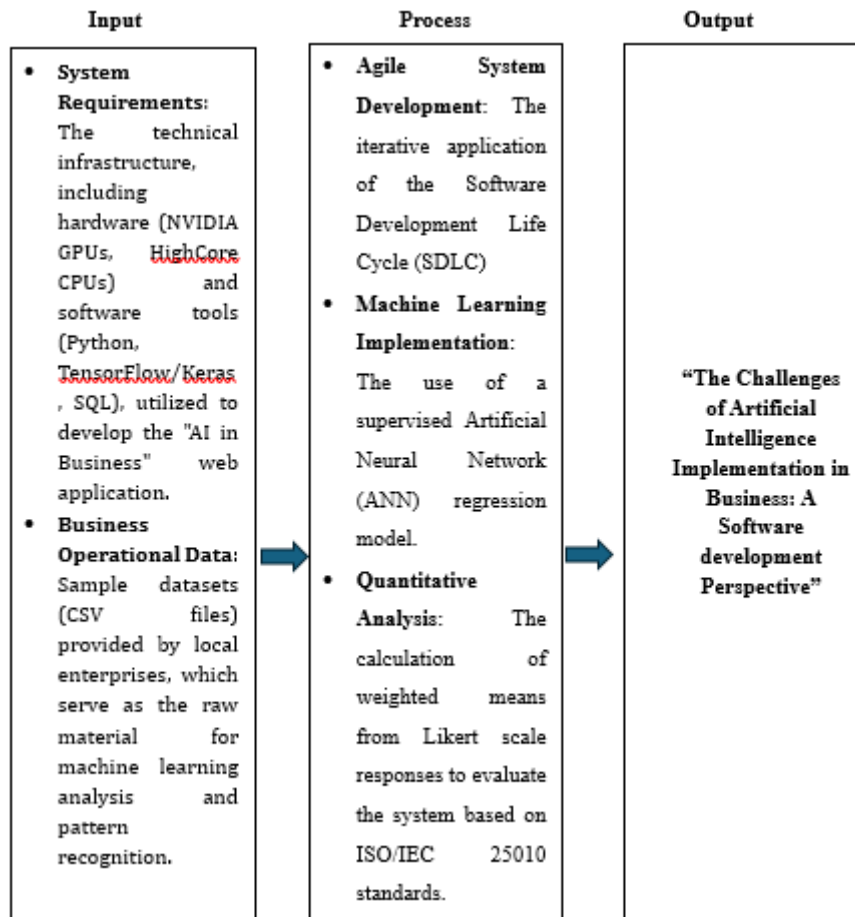
The researchers employed the Agile Software Development Life Cycle (SDLC), allowing continuous system improvement through iterative development and user feedback. The system was developed using Python, TensorFlow/Keras, SQL, and web-based technologies to support business analytics and predictive processing. A key feature of the system is the integration of an Artificial Neural Network (ANN) regression model, which analyzes business datasets to generate predictive insights and identify AI implementation patterns. System quality was evaluated using the



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ISO/IEC 25010 framework, focusing on functional suitability, performance efficiency, usability, reliability, security, and maintainability.



**Figure 1.0 IPO Diagram**

The Input-Process-Output (IPO) model for the study utilizes hardware resources such as NVIDIA GPUs, HighCore CPUs, RAM, and SSD storage, together with software tools including Python, TensorFlow/Keras, SQL, Visual Studio Code, and Jupyter Notebook. The process involves applying the Agile Software Development Life Cycle (SDLC), implementing an Artificial Neural Network (ANN) regression model, and analyzing Likert scale responses using ISO/IEC 25010 standards. The resulting output is a comprehensive understanding of the challenges of Artificial Intelligence implementation in business from a software development perspective in Cantilan, Surigao del Sur.

### System Design

The study employed Agile Software Development Life Cycle to iteratively design and develop the AI Business Analytics System. The system was implemented using Python, TensorFlow/Keras, SQL, and web-based technologies. Artificial Neural Network regression was used to analyze business operational datasets and generate predictive insights.



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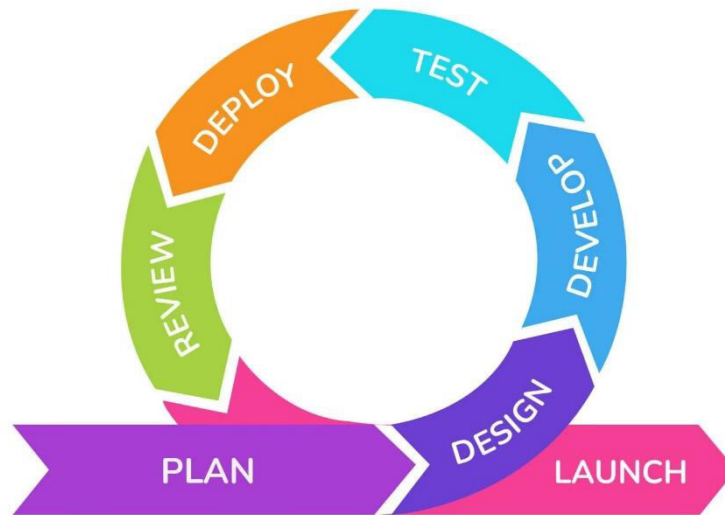


Figure 3.0 Agile Method

Figure 3.0 shows the Agile Model, which serves as the iterative and incremental development framework used to build and evaluate the AI Business Analytics System. Unlike traditional linear models, the Agile cycle emphasizes continuous feedback and flexibility, allowing the researchers to address the technical complexities of AI implementation in real-time.

### IV. RESULTS AND DISCUSSION

#### Overall Feedback Result

The developed system demonstrated strong functionality and usability across business owners and IT experts. Results show AI adoption remains at lower maturity levels, with technical skill shortages and infrastructure constraints emerging as primary implementation barriers. ISO/IEC 25010 evaluation produced high ratings for maintainability and functional suitability, while reliability and compatibility require further improvement.

Table For Overall Result

Quality Attribute	Weighted Mean	Interpretation
Software Development Practices	2.80	ME
Functional Suitability	4.09	GE
Performance Efficiency	3.50	ME
Compatibility	3.18	ME
Usability	4.28	GE
Reliability	2.86	ME
Security	3.45	ME
Maintainability	4.07	GE
Overall Weighted Mean	3.52	GE

LE – Low Extent  
 ME – Moderate Extent  
 GE – Great Extent  
 VGE – Very Great Extent



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### Data Analytics

The data for this study were collected through survey questionnaires and semi-structured interviews administered to 30 respondents in Cantilan, Surigao del Sur. The respondents consisted of local stakeholders relevant to the study. After data collection, all responses were carefully organized and encoded into a structured numerical dataset for statistical analysis. The questionnaire utilized a five-point Likert scale; therefore, qualitative responses were converted into quantitative values to enable statistical processing. Each response option was assigned corresponding numeric weights as follows:

5	Strongly Agree
4	Agree
3	Neutral
2	Disagree

### Quantitative Data Analysis

The researchers analyzed the collected data using descriptive statistical methods, particularly the computation of frequency distributions and weighted means. These methods were used to summarize respondents' evaluations and identify the general trends and perceptions regarding the system or study variables.

For the quantitative survey results, the weighted mean was computed for each evaluation criterion, such as usability, functionality, reliability, performance efficiency, and user satisfaction. This allowed the researchers to determine the overall assessment level of each category.

The computed mean scores were then interpreted using a standardized scale with qualitative descriptions such as:  
Very Great Extent (VGE)  
Great Extent (GE)  
Moderate Extent (ME)  
Low Extent (LE)  
Very Low Extent (VLE)

## V. CONCLUSION

The study concludes that businesses in Cantilan experience significant barriers to AI adoption due to poor infrastructure, lack of technical expertise, and fragmented software development practices. Despite these challenges, the AI Business Analytics System effectively supports business analytics and decision-making through predictive technologies and data visualization.

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